

SEQUENCE LISTING

<110> MUTABILIS S.A.  
<120> Pathogenicity determinants which can be used as targets for developing means for preventing and controlling bacterial infections and/or systemic dissemination  
<130> 1621  
<160> 32  
<170> PatentIn version 3.1  
<210> 1  
<211> 305  
<212> PRT  
<213> Escherichia coli  
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Trp Val Val Glu Glu Gly Phe Ala Gln Ile Pro Ser Trp His Ala Ala  
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Val Glu Arg Val Ile Pro Val Ala Ile Arg Arg Trp Arg Lys Ala Trp  
35 40 45  
Phe Ser Ala Pro Ile Lys Ala Glu Arg Lys Ala Phe Arg Glu Ala Leu  
50 55 60  
Gln Ala Glu Asn Tyr Asp Ala Val Ile Asp Ala Gln Gly Leu Val Lys  
65 70 75 80  
Ser Ala Ala Leu Val Thr Arg Leu Ala His Gly Val Lys His Gly Leu  
85 90 95  
Asp Trp Gln Thr Ala Arg Glu Pro Leu Ala Ser Leu Phe Tyr Asn Cys  
100 105 110  
Lys His His Ile Ala Lys Gln Gln His Ala Val Glu Arg Thr Arg Glu  
115 120 125  
Leu Phe Ala Lys Ser Leu Gly Tyr Ser Lys Pro Gln Thr Gln Gly Asp  
130 135 140  
Tyr Ala Ile Ala Gln His Phe Leu Thr Asn Leu Pro Thr Asp Ala Gly  
145 150 155 160  
Glu Tyr Ala Val Phe Leu His Ala Thr Thr Arg Asp Asp Lys His Trp  
165 170 175  
Pro Glu Glu His Trp Arg Glu Leu Ile Gly Leu Leu Ala Asp Ser Gly  
180 185 190  
Ile Arg Ile Lys Leu Pro Trp Gly Ala Pro His Glu Glu Glu Arg Ala

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Lys Arg Leu Ala Glu Gly Phe Ala Tyr Val Glu Val Leu Pro Lys Met  
 210 215 220

Ser Leu Glu Gly Val Ala Arg Val Leu Ala Gly Ala Lys Phe Val Val  
 225 230 235 240

Ser Val Asp Thr Gly Leu Ser His Leu Thr Ala Ala Leu Asp Arg Pro  
 245 250 255

Asn Ile Thr Val Tyr Gly Pro Thr Asp Pro Gly Leu Ile Gly Gly Tyr  
 260 265 270

Gly Lys Asn Gln Met Val Cys Arg Ala Pro Gly Asn Glu Leu Ser Gln  
 275 280 285

Leu Thr Ala Asn Ala Val Lys Arg Phe Ile Glu Glu Asn Ala Ala Met  
 290 295 300

Ile  
 305

<210> 2  
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 <213> Escherichia coli  
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Met Arg Phe His Gly Asp Met Leu Leu Thr Thr Pro Val Ile Ser Ser  
 1 5 10 15

Leu Lys Lys Asn Tyr Pro Asp Ala Lys Ile Asp Val Leu Leu Tyr Gln  
 20 25 30

Asp Thr Ile Pro Ile Leu Ser Glu Asn Pro Glu Ile Asn Ala Leu Tyr  
 35 40 45

Gly Ile Lys Asn Lys Lys Ala Lys Ala Ser Glu Lys Ile Ala Asn Phe  
 50 55 60

Phe His Leu Ile Lys Val Leu Arg Ala Asn Lys Tyr Asp Leu Ile Val  
 65 70 75 80

Asn Leu Thr Asp Gln Trp Met Val Ala Ile Leu Val Arg Leu Leu Asn  
 85 90 95

Ala Arg Val Lys Ile Ser Gln Asp Tyr His His Arg Gln Ser Ala Phe  
 100 105 110

Trp Arg Lys Ser Phe Thr His Leu Val Pro Leu Gln Gly Gly Asn Val  
 115 120 125

Val Glu Ser Asn Leu Ser Val Leu Thr Pro Leu Gly Val Asp Ser Leu  
130 135 140

Val Lys Gln Thr Thr Met Ser Tyr Pro Pro Ala Ser Trp Lys Arg Met  
145 150 155 160

Arg Arg Glu Leu Asp His Ala Gly Val Gly Gln Asn Tyr Val Val Ile  
165 170 175

Gln Pro Thr Ala Arg Gln Ile Phe Lys Cys Trp Asp Asn Ala Lys Phe  
180 185 190

Ser Ala Val Ile Asp Ala Leu His Ala Arg Gly Tyr Glu Val Val Leu  
195 200 205

Thr Ser Gly Pro Asp Lys Asp Asp Leu Ala Cys Val Asn Glu Ile Ala  
210 215 220

Gln Gly Cys Gln Thr Pro Pro Val Thr Ala Leu Ala Gly Lys Val Thr  
225 230 235 240

Phe Pro Glu Leu Gly Ala Leu Ile Asp His Ala Gln Leu Phe Ile Gly  
245 250 255

Val Asp Ser Ala Pro Ala His Ile Ala Ala Ala Val Asn Thr Pro Leu  
260 265 270

Ile Ser Leu Phe Gly Ala Thr Asp His Ile Phe Trp Arg Pro Trp Ser  
275 280 285

Asn Asn Met Ile Gln Phe Trp Ala Gly Asp Tyr Arg Glu Met Pro Thr  
290 295 300

Arg Asp Gln Arg Asp Arg Asn Glu Met Tyr Leu Ser Val Ile Pro Ala  
305 310 315 320

Ala Asp Val Ile Ala Ala Val Asp Lys Leu Leu Pro Ser Ser Thr Thr  
325 330 335

Gly Thr Ser Leu  
340

<210> 3  
<211> 265  
<212> PRT  
<213> Escherichia coli  
<400> 3

Met Val Glu Leu Lys Glu Pro Phe Ala Thr Leu Trp Arg Gly Lys Asp  
1 5 10 15

Pro Phe Glu Glu Val Lys Thr Leu Gln Gly Glu Val Phe Arg Glu Leu  
 20 25 30

Glu Thr Arg Arg Thr Leu Arg Phe Glu Met Ala Gly Lys Ser Tyr Phe  
 35 40 45

Leu Lys Trp His Arg Gly Thr Thr Leu Lys Glu Ile Ile Lys Asn Leu  
 50 55 60

Leu Ser Leu Arg Met Pro Val Leu Gly Ala Asp Arg Glu Trp Asn Ala  
 65 70 75 80

Ile His Arg Leu Arg Asp Val Gly Val Asp Thr Met Tyr Gly Val Ala  
 85 90 95

Phe Gly Glu Lys Gly Met Asn Pro Leu Thr Arg Thr Ser Phe Ile Ile  
 100 105 110

Thr Glu Asp Leu Thr Pro Thr Ile Ser Leu Glu Asp Tyr Cys Ala Asp  
 115 120 125

Trp Ala Thr Asn Pro Pro Asp Val Arg Val Lys Arg Met Leu Ile Lys  
 130 135 140

Arg Val Ala Thr Met Val Arg Asp Met His Ala Ala Gly Ile Asn His  
 145 150 155 160

Arg Asp Cys Tyr Ile Cys His Phe Leu Leu His Leu Pro Phe Ser Gly  
 165 170 175

Lys Glu Glu Glu Leu Lys Ile Ser Val Ile Asp Leu His Arg Ala Gln  
 180 185 190

Leu Arg Thr Arg Val Pro Arg Arg Trp Arg Asp Lys Asp Leu Ile Gly  
 195 200 205

Leu Tyr Phe Ser Ser Met Asn Ile Gly Leu Thr Gln Arg Asp Ile Trp  
 210 215 220

Arg Phe Met Lys Val Tyr Phe Ala Ala Pro Leu Lys Asp Ile Leu Lys  
 225 230 235 240

Gln Glu Gln Gly Leu Leu Ser Gln Ala Glu Ala Lys Ala Thr Lys Ile  
 245 250 255

Arg Glu Arg Thr Ile Arg Lys Ser Leu  
 260 265

<211> 374  
 <212> PRT  
 <213> Escherichia coli  
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Met Ile Val Ala Phe Cys Leu Tyr Lys Tyr Phe Pro Phe Gly Gly Leu  
 1 5 10 15

Gln Arg Asp Phe Met Arg Ile Ala Gln Thr Val Ala Ala Arg Gly His  
 20 25 30

His Val Arg Val Tyr Thr Gln Ser Trp Glu Gly Glu Cys Pro Asp Val  
 35 40 45

Phe Glu Leu Ile Lys Val Pro Val Lys Ser His Thr Asn His Gly Arg  
 50 55 60

Asn Ala Glu Tyr Phe Ala Trp Val Gln Lys His Leu Arg Glu His Pro  
 65 70 75 80

Val Asp Lys Val Val Gly Phe Asn Lys Met Pro Gly Leu Asp Val Tyr  
 85 90 95

Tyr Ala Ala Asp Val Cys Tyr Ala Glu Lys Val Ala Gln Glu Lys Gly  
 100 105 110

Phe Phe Tyr Arg Leu Thr Ser Arg Tyr Arg His Tyr Ala Ala Phe Glu  
 115 120 125

Arg Ala Thr Phe Glu Gln Gly Lys Pro Thr Gln Leu Leu Met Leu Thr  
 130 135 140

Asp Lys Gln Ile Ala Asp Phe Gln Lys His Tyr Gln Thr Glu Ala Glu  
 145 150 155 160

Arg Phe His Ile Leu Pro Pro Gly Ile Tyr Pro Asp Arg Lys Tyr Ser  
 165 170 175

Gln Gln Pro Ala Asn Ser Arg Glu Ile Phe Arg Lys Lys Asn Gly Ile  
 180 185 190

Thr Glu Gln Gln Tyr Leu Leu Leu Gln Val Gly Ser Asp Phe Thr Arg  
 195 200 205

Lys Gly Val Asp Arg Ser Ile Glu Ala Leu Ala Ser Leu Pro Asp Ser  
 210 215 220

Leu Arg His Asn Thr Leu Leu Tyr Val Val Gly Gln Asp Lys Pro Arg  
 225 230 235 240

Lys Phe Glu Ala Leu Ala Glu Lys Arg Gly Val Arg Ser Asn Val His

Pro Phe Phe Ala Gly Ile Pro His Arg Thr Gly Trp Arg Gly Glu Met

100	105	110
Arg Tyr Gly Leu Leu Asn Asp Val Arg Val Leu Asp Lys Glu Ala Trp		
115	120	125
Pro Leu Met Val Glu Arg Tyr Ile Ala Leu Ala Tyr Asp Lys Gly Ile		
130	135	140
Met Arg Thr Ala Gln Asp Leu Pro Gln Pro Leu Leu Trp Pro Gln Leu		
145	150	155
Gln Val Ser Glu Gly Glu Lys Ser Tyr Thr Cys Asn Gln Phe Ser Leu		
165	170	175
Ser Ser Glu Arg Pro Met Ile Gly Phe Cys Pro Gly Ala Glu Phe Gly		
180	185	190
Pro Ala Lys Arg Trp Pro His Tyr His Tyr Ala Glu Leu Ala Lys Gln		
195	200	205
Leu Ile Asp Glu Gly Tyr Gln Val Val Leu Phe Gly Ser Ala Lys Asp		
210	215	220
His Glu Ala Gly Asn Glu Ile Leu Ala Ala Leu Asn Thr Glu Gln Gln		
225	230	235
Ala Trp Cys Arg Asn Leu Ala Gly Glu Thr Gln Leu Asp Gln Ala Val		
245	250	255
Ile Leu Ile Ala Ala Cys Lys Ala Ile Val Thr Asn Asp Ser Gly Leu		
260	265	270
Met His Val Ala Ala Ala Leu Asn Arg Pro Leu Val Ala Leu Tyr Gly		
275	280	285
Pro Ser Ser Pro Asp Phe Thr Pro Pro Leu Ser His Lys Ala Arg Val		
290	295	300
Ile Arg Leu Ile Thr Gly Tyr His Lys Val Arg Lys Gly Asp Ala Ala		
305	310	315
Glu Gly Tyr His Gln Ser Leu Ile Asp Ile Thr Pro Gln Arg Val Leu		
325	330	335
Glu Glu Leu Asn Ala Leu Leu Leu Gln Glu Glu Ala		
340	345	

<210> 6  
 <211> 338  
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<213> Escherichia coli  
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Met Ser Ala His Tyr Phe Asn Pro Gln Glu Met Ile Asn Lys Thr Ile  
 1 5 10 15

Ile Phe Asp Glu Arg Pro Ala Ala Ser Val Ala Ser Ser Phe His Val  
 20 25 30

Ala Tyr Gly Ile Asp Lys Asn Phe Leu Phe Gly Cys Gly Val Ser Ile  
 35 40 45

Thr Ser Val Leu Leu His Asn Asn Asp Val Ser Phe Val Phe His Val  
 50 55 60

Phe Ile Asp Asp Ile Pro Glu Ala Asp Ile Gln Arg Leu Ala Gln Leu  
 65 70 75 80

Ala Lys Ser Tyr Arg Thr Cys Ile Gln Ile His Leu Val Asn Cys Glu  
 85 90 95

Arg Leu Lys Ala Leu Pro Thr Thr Lys Asn Trp Ser Ile Ala Met Tyr  
 100 105 110

Phe Arg Phe Val Ile Ala Asp Tyr Phe Ile Asp Gln Gln Asp Lys Ile  
 115 120 125

Leu Tyr Leu Asp Ala Asp Ile Ala Cys Gln Gly Asn Leu Lys Pro Leu  
 130 135 140

Ile Thr Met Asp Leu Ala Asn Asn Val Ala Ala Val Val Thr Glu Arg  
 145 150 155 160

Asp Ala Asn Trp Trp Ser Leu Arg Gly Gln Ser Leu Gln Cys Asn Glu  
 165 170 175

Leu Glu Lys Gly Tyr Phe Asn Ser Gly Val Leu Leu Ile Asn Thr Leu  
 180 185 190

Ala Trp Ala Gln Glu Ser Val Ser Ala Lys Ala Met Ser Met Leu Ala  
 195 200 205

Asp Lys Ala Ile Val Ser Arg Leu Thr Tyr Met Asp Gln Asp Ile Leu  
 210 215 220

Asn Leu Ile Leu Leu Gly Lys Val Lys Phe Ile Asp Ala Lys Tyr Asn  
 225 230 235 240

Thr Gln Phe Ser Leu Asn Tyr Glu Leu Lys Lys Ser Phe Val Cys Pro  
 245 250 255



Ile Asn Asp Glu Thr Val Leu Ile His Tyr Val Gly Pro Thr Lys Pro  
260 265 270

Trp His Tyr Trp Ala Gly Tyr Pro Ser Ala Gln Pro Phe Ile Lys Ala  
275 280 285

Lys Glu Ala Ser Pro Trp Lys Asn Glu Pro Leu Met Arg Pro Val Asn  
290 295 300

Ser Asn Tyr Ala Arg Tyr Cys Ala Lys His Asn Phe Lys Gln Asn Lys  
305 310 315 320

Pro Ile Asn Gly Ile Met Asn Tyr Ile Tyr Tyr Phe Tyr Leu Lys Ile  
325 330 335

Ile Lys

<210> 7  
<211> 302  
<212> PRT  
<213> Escherichia coli  
<400> 7

Met Ala Ala Ile Asn Thr Lys Val Lys Lys Ala Val Ile Pro Val Ala  
1 5 10 15

Gly Leu Gly Thr Arg Met Leu Pro Ala Thr Lys Ala Ile Pro Lys Glu  
20 25 30

Met Leu Pro Leu Val Asp Lys Pro Leu Ile Gln Tyr Val Val Asn Glu  
35 40 45

Cys Ile Ala Ala Gly Ile Thr Glu Ile Val Leu Val Thr His Ser Ser  
50 55 60

Lys Asn Ser Ile Glu Asn His Phe Asp Thr Ser Phe Glu Leu Glu Ala  
65 70 75 80

Met Leu Glu Lys Arg Val Lys Arg Gln Leu Leu Asp Glu Val Gln Ser  
85 90 95

Ile Cys Pro Pro His Val Thr Ile Met Gln Val Arg Gln Gly Leu Ala  
100 105 110

Lys Gly Leu Gly His Ala Val Leu Cys Ala His Pro Val Val Gly Asp  
115 120 125

Glu Pro Val Ala Val Ile Leu Pro Asp Val Ile Leu Asp Glu Tyr Glu  
130 135 140

Ser Asp Leu Ser Gln Asp Asn Leu Ala Glu Met Ile Arg Arg Phe Asp  
145 150 155 160

Glu Thr Gly His Ser Gln Ile Met Val Glu Pro Val Ala Asp Val Thr  
165 170 175

Ala Tyr Gly Val Val Asp Cys Lys Gly Val Glu Leu Ala Pro Gly Glu  
180 185 190

Ser Val Pro Met Val Gly Val Val Glu Lys Pro Lys Ala Asp Val Ala  
195 200 205

Pro Ser Asn Leu Ala Ile Val Gly Arg Tyr Val Leu Ser Ala Asp Ile  
210 215 220

Trp Pro Leu Leu Ala Lys Thr Pro Pro Gly Ala Gly Asp Glu Ile Gln  
225 230 235 240

Leu Thr Asp Ala Ile Asp Met Leu Ile Glu Lys Glu Thr Val Glu Ala  
245 250 255

Tyr His Met Lys Gly Lys Ser His Asp Cys Gly Asn Lys Leu Gly Tyr  
260 265 270

Met Gln Ala Phe Val Glu Tyr Gly Ile Arg His Asn Thr Leu Gly Thr  
275 280 285

Glu Phe Lys Ala Trp Leu Glu Glu Glu Met Gly Ile Lys Lys  
290 295 300

<210> 8  
<211> 546  
<212> PRT  
<213> Escherichia coli  
<400> 8

Met Ala Ile His Asn Arg Ala Gly Gln Pro Ala Gln Gln Ser Asp Leu  
1 5 10 15

Ile Asn Val Ala Gln Leu Thr Ala Gln Tyr Tyr Val Leu Lys Pro Glu  
20 25 30

Ala Gly Asn Ala Glu His Ala Val Lys Phe Gly Thr Ser Gly His Arg  
35 40 45

Gly Ser Ala Ala Arg His Ser Phe Asn Glu Pro His Ile Leu Ala Ile  
50 55 60

Ala Gln Ala Ile Ala Glu Glu Arg Ala Lys Asn Gly Ile Thr Gly Pro  
65 70 75 80

Cys Tyr Val Gly Lys Asp Thr His Ala Leu Ser Glu Pro Ala Phe Ile  
                     85                    90                    95

Ser Val Leu Glu Val Leu Ala Ala Asn Gly Val Asp Val Ile Val Gln  
                     100                    105                    110

Glu Asn Asn Gly Phe Thr Pro Thr Pro Ala Val Ser Asn Ala Ile Leu  
                     115                    120                    125

Val His Asn Lys Lys Gly Gly Pro Leu Ala Asp Gly Ile Val Ile Thr  
                     130                    135                    140

Pro Ser His Asn Pro Pro Glu Asp Gly Gly Ile Lys Tyr Asn Pro Pro  
                     145                    150                    155                    160

Asn Gly Gly Pro Ala Asp Thr Asn Val Thr Lys Val Val Glu Asp Arg  
                     165                    170                    175

Ala Asn Ala Leu Leu Ala Asp Gly Leu Lys Gly Val Lys Arg Ile Ser  
                     180                    185                    190

Leu Asp Glu Ala Met Ala Ser Gly His Val Lys Glu Gln Asp Leu Val  
                     195                    200                    205

Gln Pro Phe Val Glu Gly Leu Ala Asp Ile Val Asp Met Ala Ala Ile  
                     210                    215                    220

Gln Lys Ala Gly Leu Thr Leu Gly Val Asp Pro Leu Gly Gly Ser Gly  
                     225                    230                    235                    240

Ile Glu Tyr Trp Lys Arg Ile Gly Glu Tyr Tyr Asn Leu Asn Leu Thr  
                     245                    250                    255

Ile Val Asn Asp Gln Val Asp Gln Thr Phe Arg Phe Met His Leu Asp  
                     260                    265                    270

Lys Asp Gly Ala Ile Arg Met Asp Cys Ser Ser Glu Cys Ala Met Ala  
                     275                    280                    285

Gly Leu Leu Ala Leu Arg Asp Lys Phe Asp Leu Ala Phe Ala Asn Asp  
                     290                    295                    300

Pro Asp Tyr Asp Arg His Gly Ile Val Thr Pro Ala Gly Leu Met Asn  
                     305                    310                    315                    320

Pro Asn His Tyr Leu Ala Val Ala Ile Asn Tyr Leu Phe Gln His Arg  
                     325                    330                    335

Pro Gln Trp Gly Lys Asp Val Ala Val Gly Lys Thr Leu Val Ser Ser

340 345 350  
 Ala Met Ile Asp Arg Val Val Asn Asp Leu Gly Arg Lys Leu Val Glu  
 355 360 365  
 Val Pro Val Gly Phe Lys Trp Phe Val Asp Gly Leu Phe Asp Gly Ser  
 370 375 380  
 Phe Gly Phe Gly Gly Glu Glu Ser Ala Gly Ala Ser Phe Leu Arg Phe  
 385 390 395 400  
 Asp Gly Thr Pro Trp Ser Thr Asp Lys Asp Gly Ile Ile Met Cys Leu  
 405 410 415  
 Leu Ala Ala Glu Ile Thr Ala Val Thr Gly Lys Asn Pro Gln Glu His  
 420 425 430  
 Tyr Asn Glu Leu Ala Lys Arg Phe Gly Ala Pro Ser Tyr Asn Arg Leu  
 435 440 445  
 Gln Ala Ala Ala Thr Ser Ala Gln Lys Ala Ala Leu Ser Lys Leu Ser  
 450 455 460  
 Pro Glu Met Val Ser Ala Ser Thr Leu Ala Gly Asp Pro Ile Thr Ala  
 465 470 475 480  
 Arg Leu Thr Ala Ala Pro Gly Asn Gly Ala Ser Ile Gly Gly Leu Lys  
 485 490 495  
 Val Met Thr Asp Asn Gly Trp Phe Ala Ala Arg Pro Ser Gly Thr Glu  
 500 505 510  
 Asp Ala Tyr Lys Ile Tyr Cys Glu Ser Phe Leu Gly Glu Glu His Arg  
 515 520 525  
 Lys Gln Ile Glu Lys Glu Ala Val Glu Ile Val Ser Glu Val Leu Lys  
 530 535 540  
 Asn Ala  
 545  
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 <213> Escherichia coli  
 <400> 9  
 Met Lys Leu Phe Lys Ser Ile Leu Leu Ile Ala Ala Cys His Ala Ala  
 1 5 10 15  
 Gln Ala Ser Ala Ala Ile Asp Ile Asn Ala Asp Pro Asn Leu Thr Gly

Ala	Ala	Pro	Leu	Thr	Gly	Ile	Leu	Asn	Gly	Gln	Gln	Ser	Asp	Thr	Gln	
		35						40					45			
Asn	Met	Ser	Gly	Phe	Asp	Asn	Thr	Pro	Pro	Pro	Ser	Pro	Pro	Val	Val	
	50					55					60					
Met	Ser	Arg	Met	Phe	Gly	Ala	Gln	Leu	Phe	Asn	Gly	Thr	Ser	Ala	Asp	
65					70					75					80	
Ser	Gly	Ala	Thr	Val	Gly	Phe	Asn	Pro	Asp	Tyr	Ile	Leu	Asn	Pro	Gly	
				85					90					95		
Asp	Ser	Ile	Gln	Val	Arg	Leu	Trp	Gly	Ala	Phe	Thr	Phe	Asp	Gly	Ala	
			100					105						110		
Leu	Gln	Val	Asp	Pro	Lys	Gly	Asn	Ile	Phe	Leu	Pro	Asn	Val	Gly	Pro	
		115					120						125			
Val	Lys	Val	Ala	Gly	Val	Ser	Asn	Ser	Gln	Leu	Asn	Ala	Leu	Val	Thr	
	130					135					140					
Ser	Lys	Val	Lys	Glu	Val	Tyr	Gln	Ser	Asn	Val	Asn	Val	Tyr	Ala	Ser	
145					150					155					160	
Leu	Leu	Gln	Ala	Gln	Pro	Val	Lys	Val	Tyr	Val	Thr	Gly	Phe	Val	Arg	
				165					170					175		
Asn	Pro	Gly	Leu	Tyr	Gly	Gly	Val	Thr	Ser	Asp	Ser	Leu	Leu	Asn	Tyr	
			180					185						190		
Leu	Ile	Lys	Ala	Gly	Gly	Val	Asp	Pro	Glu	Arg	Gly	Ser	Tyr	Val	Asp	
		195					200					205				
Ile	Val	Val	Lys	Arg	Gly	Asn	Arg	Val	Arg	Ser	Asn	Val	Asn	Leu	Tyr	
	210					215					220					
Asp	Phe	Leu	Leu	Asn	Gly	Lys	Leu	Gly	Leu	Ser	Gln	Phe	Ala	Asp	Gly	
225					230					235					240	
Asp	Thr	Ile	Ile	Val	Gly	Pro	Arg	Gln	His	Thr	Phe	Ser	Val	Gln	Gly	
				245					250					255		
Asp	Val	Phe	Asn	Ser	Tyr	Asp	Phe	Glu	Phe	Arg	Glu	Ser	Ser	Ile	Pro	
			260					265						270		
Val	Thr	Glu	Ala	Leu	Ser	Trp	Ala	Arg	Pro	Lys	Pro	Gly	Ala	Thr	His	
		275					280					285				

Ile Thr Ile Met Arg Lys Gln Gly Leu Gln Lys Arg Ser Glu Tyr Tyr  
 290 295 300

Pro Ile Ser Ser Ala Pro Gly Arg Met Leu Gln Asn Gly Asp Thr Leu  
 305 310 315 320

Ile Val Ser Thr Asp Arg Tyr Ala Gly Thr Ile Gln Val Arg Val Glu  
 325 330 335

Gly Ala His Ser Gly Glu His Ala Met Val Leu Pro Tyr Gly Ser Thr  
 340 345 350

Met Arg Ala Val Leu Glu Lys Val Arg Pro Asn Ser Met Ser Gln Met  
 355 360 365

Asn Ala Val Gln Leu Tyr Arg Pro Ser Val Ala Gln Arg Gln Lys Glu  
 370 375 380

Met Leu Asn Leu Ser Leu Gln Lys Leu Glu Glu Ala Ser Leu Ser Ala  
 385 390 395 400

Gln Ser Ser Thr Lys Glu Glu Ala Ser Leu Arg Met Gln Glu Ala Gln  
 405 410 415

Leu Ile Ser Arg Phe Val Ala Lys Ala Arg Thr Val Val Pro Lys Gly  
 420 425 430

Glu Val Ile Leu Asn Glu Ser Asn Ile Asp Ser Val Leu Leu Glu Asp  
 435 440 445

Gly Asp Val Ile Asn Ile Pro Glu Lys Thr Ser Leu Val Met Val His  
 450 455 460

Gly Glu Val Leu Phe Pro Asn Ala Val Ser Trp Gln Lys Gly Met Thr  
 465 470 475 480

Thr Glu Asp Tyr Ile Glu Lys Cys Gly Gly Leu Thr Gln Lys Ser Gly  
 485 490 495

Asn Ala Arg Ile Ile Val Ile Arg Gln Asn Gly Ala Ala Val Asn Ala  
 500 505 510

Glu Asp Val Asp Ser Leu Lys Pro Gly Asp Glu Ile Met Val Leu Pro  
 515 520 525

Lys Tyr Glu Ser Lys Asn Ile Glu Val Thr Arg Gly Ile Ser Thr Ile  
 530 535 540

Leu Tyr Gln Leu Ala Val Gly Ala Lys Val Ile Leu Ser Leu

545

550

555

<210> 10  
 <211> 207  
 <212> PRT  
 <213> Escherichia coli  
 <400> 10

Met Ser Lys Lys Leu Ile Ile Phe Gly Ala Gly Gly Phe Ser Lys Ser  
 1 5 10 15

Ile Ile Asp Ser Leu Asn His Lys His Tyr Glu Leu Ile Gly Phe Ile  
 20 25 30

Asp Lys Tyr Lys Ser Gly Tyr His Gln Ser Tyr Pro Ile Leu Gly Asn  
 35 40 45

Asp Ile Ala Asp Ile Glu Asn Lys Asp Asn Tyr Tyr Tyr Phe Ile Gly  
 50 55 60

Ile Gly Lys Pro Ser Thr Arg Lys His Tyr Leu Asn Ile Ile Arg Lys  
 65 70 75 80

His Asn Leu Arg Leu Ile Asn Ile Ile Asp Lys Thr Ala Ile Leu Ser  
 85 90 95

Pro Asn Ile Ile Leu Gly Asp Gly Ile Phe Ile Gly Lys Met Cys Ile  
 100 105 110

Leu Asn Arg Asp Thr Arg Ile His Asp Ala Val Val Ile Asn Thr Arg  
 115 120 125

Ser Leu Ile Glu His Gly Asn Glu Ile Gly Cys Cys Ser Asn Ile Ser  
 130 135 140

Thr Asn Val Val Leu Asn Gly Asp Val Ser Val Gly Glu Glu Thr Phe  
 145 150 155 160

Val Gly Ser Val Thr Val Val Asn Gly Gln Leu Lys Leu Gly Ser Lys  
 165 170 175

Ser Ile Ile Gly Ser Gly Ser Val Val Ile Arg Asn Ile Pro Ser Asn  
 180 185 190

Val Val Val Ala Gly Thr Pro Thr Arg Leu Ile Arg Gly Asn Glu  
 195 200 205

<210> 11  
 <211> 191  
 <212> PRT  
 <213> Escherichia coli  
 <400> 11

Met Ala Lys Ser Val Pro Ala Ile Phe Leu Asp Arg Asp Gly Thr Ile  
 1 5 10 15

Asn Val Asp His Gly Tyr Val His Glu Ile Asp Asn Phe Glu Phe Ile  
 20 25 30

Asp Gly Val Ile Asp Ala Met Arg Glu Leu Lys Lys Met Gly Phe Ala  
 35 40 45

Leu Val Val Val Thr Asn Gln Ser Gly Ile Ala Arg Gly Lys Phe Thr  
 50 55 60

Glu Ala Gln Phe Glu Thr Leu Thr Glu Trp Met Asp Trp Ser Leu Ala  
 65 70 75 80

Asp Arg Asp Val Asp Leu Asp Gly Ile Tyr Tyr Cys Pro His His Pro  
 85 90 95

Gln Gly Ser Val Glu Glu Phe Arg Gln Val Cys Asp Cys Arg Lys Pro  
 100 105 110

His Pro Gly Met Leu Leu Ser Ala Arg Asp Tyr Leu His Ile Asp Met  
 115 120 125

Ala Ala Ser Tyr Met Val Gly Asp Lys Leu Glu Asp Met Gln Ala Ala  
 130 135 140

Val Ala Ala Asn Val Gly Thr Lys Val Leu Val Arg Thr Gly Lys Pro  
 145 150 155 160

Ile Thr Pro Glu Ala Glu Asn Ala Ala Asp Trp Val Leu Asn Ser Leu  
 165 170 175

Ala Asp Leu Pro Gln Ala Ile Lys Lys Gln Gln Lys Pro Ala Gln  
 180 185 190

<210> 12  
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 <212> PRT  
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 <400> 12

Met Ile Ile Val Thr Gly Gly Ala Gly Phe Ile Gly Ser Asn Ile Val  
 1 5 10 15

Lys Ala Leu Asn Asp Lys Gly Ile Thr Asp Ile Leu Val Val Asp Asn  
 20 25 30

Leu Lys Asp Gly Thr Lys Phe Val Asn Leu Val Asp Leu Asn Ile Ala  
 35 40 45



Asp Tyr Met Asp Lys Glu Asp Phe Leu Ile Gln Ile Met Ala Gly Glu  
 50 55 60

Glu Phe Gly Asp Val Glu Ala Ile Phe His Glu Gly Ala Cys Ser Ser  
 65 70 75 80

Thr Thr Glu Trp Asp Gly Lys Tyr Met Met Asp Asn Asn Tyr Gln Tyr  
 85 90 95

Ser Lys Glu Leu Leu His Tyr Cys Leu Glu Arg Glu Ile Pro Phe Leu  
 100 105 110

Tyr Ala Ser Ser Ala Ala Thr Tyr Gly Gly Arg Thr Ser Asp Phe Ile  
 115 120 125

Glu Ser Arg Glu Tyr Glu Lys Pro Leu Asn Val Tyr Gly Tyr Ser Lys  
 130 135 140

Phe Leu Phe Asp Glu Tyr Val Arg Gln Ile Leu Pro Glu Ala Asn Ser  
 145 150 155 160

Gln Ile Val Gly Phe Arg Tyr Phe Asn Val Tyr Gly Pro Arg Glu Gly  
 165 170 175

His Lys Gly Ser Met Ala Ser Val Ala Phe His Leu Asn Thr Gln Leu  
 180 185 190

Asn Asn Gly Glu Ser Pro Lys Leu Phe Glu Gly Ser Glu Asn Phe Lys  
 195 200 205

Arg Asp Phe Val Tyr Val Gly Asp Val Ala Asp Val Asn Leu Trp Phe  
 210 215 220

Leu Glu Asn Gly Val Ser Gly Ile Phe Asn Leu Gly Thr Gly Arg Ala  
 225 230 235 240

Glu Ser Phe Gln Ala Val Ala Asp Ala Thr Leu Ala Tyr His Lys Lys  
 245 250 255

Gly Gln Ile Glu Tyr Ile Pro Phe Pro Asp Lys Leu Lys Gly Arg Tyr  
 260 265 270

Gln Ala Phe Thr Gln Ala Asp Leu Thr Asn Leu Arg Ala Ala Gly Tyr  
 275 280 285

Asp Lys Pro Phe Lys Thr Val Ala Glu Gly Val Thr Glu Tyr Met Ala  
 290 295 300

Trp Leu Asn Arg Asp Ala

305

310

<210> 13  
 <211> 477  
 <212> PRT  
 <213> Escherichia coli  
 <400> 13

Met Lys Val Thr Leu Pro Glu Phe Glu Arg Ala Gly Val Met Val Val  
 1 5 10 15

Gly Asp Val Met Leu Asp Arg Tyr Trp Tyr Gly Pro Thr Ser Arg Ile  
 20 25 30

Ser Pro Glu Ala Pro Val Pro Val Val Lys Val Asn Thr Ile Glu Glu  
 35 40 45

Arg Pro Gly Gly Ala Ala Asn Val Ala Met Asn Ile Ala Ser Leu Gly  
 50 55 60

Ala Asn Ala Arg Leu Val Gly Leu Thr Gly Ile Asp Asp Ala Ala Arg  
 65 70 75 80

Ala Leu Ser Lys Ser Leu Ala Asp Val Asn Val Lys Cys Asp Phe Val  
 85 90 95

Ser Val Pro Thr His Pro Thr Ile Thr Lys Leu Arg Val Leu Ser Arg  
 100 105 110

Asn Gln Gln Leu Ile Arg Leu Asp Phe Glu Glu Gly Phe Glu Gly Val  
 115 120 125

Asp Pro Gln Pro Leu His Glu Arg Ile Asn Gln Ala Leu Ser Ser Ile  
 130 135 140

Gly Ala Leu Val Leu Ser Asp Tyr Ala Lys Gly Ala Leu Ala Ser Val  
 145 150 155 160

Gln Gln Met Ile Gln Leu Ala Arg Lys Ala Gly Val Pro Val Leu Ile  
 165 170 175

Asp Pro Lys Gly Thr Asp Phe Glu Arg Tyr Arg Gly Ala Thr Leu Leu  
 180 185 190

Thr Pro Asn Leu Ser Glu Phe Glu Ala Val Val Gly Lys Cys Lys Thr  
 195 200 205

Glu Glu Glu Ile Val Glu Arg Gly Met Lys Leu Ile Ala Asp Tyr Glu  
 210 215 220

Leu Ser Ala Leu Leu Val Thr Arg Ser Glu Gln Gly Met Ser Leu Leu

225					230					235					240
Gln	Pro	Gly	Lys	Ala	Pro	Leu	His	Met	Pro	Thr	Gln	Ala	Gln	Glu	Val
				245					250					255	
Tyr	Asp	Val	Thr	Gly	Ala	Gly	Asp	Thr	Val	Ile	Gly	Val	Leu	Ala	Ala
			260					265					270		
Thr	Leu	Ala	Ala	Gly	Asn	Ser	Leu	Glu	Glu	Ala	Cys	Phe	Phe	Ala	Asn
		275					280					285			
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		290					295				300				
Pro	Ile	Glu	Leu	Glu	Asn	Ala	Val	Arg	Gly	Arg	Ala	Asp	Thr	Gly	Phe
305					310					315					320
Gly	Val	Met	Thr	Glu	Glu	Glu	Leu	Lys	Leu	Ala	Val	Ala	Ala	Ala	Arg
				325					330					335	
Lys	Arg	Gly	Glu	Lys	Val	Val	Met	Thr	Asn	Gly	Val	Phe	Asp	Ile	Leu
			340					345					350		
His	Ala	Gly	His	Val	Ser	Tyr	Leu	Ala	Asn	Ala	Arg	Lys	Leu	Gly	Asp
		355					360					365			
Arg	Leu	Ile	Val	Ala	Val	Asn	Ser	Asp	Ala	Ser	Thr	Lys	Arg	Leu	Lys
		370				375					380				
Gly	Asp	Ser	Arg	Pro	Val	Asn	Pro	Leu	Glu	Gln	Arg	Met	Ile	Val	Leu
385					390					395					400
Gly	Ala	Leu	Glu	Ala	Val	Asp	Trp	Val	Val	Ser	Phe	Glu	Glu	Asp	Thr
				405					410					415	
Pro	Gln	Arg	Leu	Ile	Ala	Gly	Ile	Leu	Pro	Asp	Leu	Leu	Val	Lys	Gly
			420					425					430		
Gly	Asp	Tyr	Lys	Pro	Glu	Glu	Ile	Ala	Gly	Ser	Lys	Glu	Val	Trp	Ala
		435					440					445			
Asn	Gly	Gly	Glu	Val	Leu	Val	Leu	Asn	Phe	Glu	Asp	Gly	Cys	Ser	Thr
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465					470					475					

<213> Escherichia coli  
 <400> 14

Met Leu Lys Arg Leu Gly Lys Val Phe Gly Pro Leu Val Cys Ala Leu  
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His Leu Gly Lys Glu Lys Asn Ser Ala Val Ala Leu Thr Lys Ala Gly  
 35 40 45

Phe Lys Ser Arg Val Gln Lys Val Arg Ala Phe Ser Asp Pro Lys Ala  
 50 55 60

Asn Phe Val Pro Phe Phe Gly Ser Ser Glu Trp Leu Arg Phe Asp Ala  
 65 70 75 80

Met His Pro Ser Val Leu Ala Glu Ala Tyr Lys Arg Pro Tyr Ile Pro  
 85 90 95

Tyr Leu Leu Gly Gln Lys Gly Ala Ala Ser Leu Thr Gln Tyr Tyr Gly  
 100 105 110

Ile Gln Gln Ile Lys Gly Gln Ile Lys Asn Lys Lys Ala Ile Tyr Val  
 115 120 125

Ile Ser Pro Gln Trp Phe Val Arg Lys Gly Ala Asn Lys Gly Ala Phe  
 130 135 140

Gln Asn Tyr Phe Ser Asn Asp Gln Thr Ile Arg Phe Leu Gln Asn Gln  
 145 150 155 160

Thr Gly Thr Thr Tyr Asp Arg Tyr Ala Ala Arg Arg Leu Leu Lys Leu  
 165 170 175

Tyr Pro Glu Ala Ser Met Ser Asp Leu Ile Glu Lys Val Ala Asp Gly  
 180 185 190

Gln Lys Leu Ser Asn Lys Asp Lys Gln Arg Leu Lys Phe Asn Asp Trp  
 195 200 205

Val Phe Glu Lys Thr Asp Ala Ile Phe Ser Tyr Leu Pro Leu Gly Lys  
 210 215 220

Thr Tyr Asn Gln Val Ile Met Pro His Val Gly Lys Leu Pro Lys Ala  
 225 230 235 240

Phe Ser Tyr Asn His Leu Ser Arg Ile Ala Ser Gln Asp Ala Lys Val  
 245 250 255

Ala Thr Arg Ser Asn Gln Phe Gly Ile Asp Asp Arg Phe Tyr Gln Thr  
 260 265 270

Arg Ile Lys Lys His Leu Lys Lys Leu Lys Gly Ser Gln Arg His Phe  
 275 280 285

Asn Tyr Thr Lys Ser Pro Glu Phe Asn Asp Leu Gln Leu Val Leu Asn  
 290 295 300

Glu Phe Ser Lys Gln Asn Thr Asp Val Leu Phe Val Ile Pro Pro Val  
 305 310 315 320

Asn Lys Lys Trp Thr Asp Tyr Thr Gly Leu Asp Gln Lys Met Tyr Gln  
 325 330 335

Lys Ser Val Glu Lys Ile Lys His Gln Leu Gln Ser Gln Gly Phe Asn  
 340 345 350

His Ile Ser Asp Leu Ser Arg Asp Gly Gly Lys Pro Tyr Phe Met Gln  
 355 360 365

Asp Thr Ile His Leu Gly Trp Asn Gly Trp Leu Glu Leu Asp Lys His  
 370 375 380

Ile Asn Pro Phe Leu Thr Glu Glu Asn Ser Lys Pro Asn Tyr His Ile  
 385 390 395 400

Asn Asn Lys Phe Leu Lys Arg Ser Trp Ala Lys Tyr Thr Gly Arg Pro  
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Ser Asp Tyr Lys  
 420

<210> 15  
 <211> 511  
 <212> PRT  
 <213> Escherichia coli  
 <400> 15

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 20 25 30

Gln Leu Lys Val Asp Ser Asp Ser Leu Ala Ala His Ile Asp Ser Leu  
 35 40 45

Gly Leu Val Glu Lys Ser Pro Val Leu Val Phe Gly Gly Gln Glu Tyr  
 50 55 60

Glu Met Leu Ala Thr Phe Val Ala Leu Thr Lys Ser Gly His Ala Tyr  
 65 70 75 80

Ile Pro Val Asp Gln His Ser Ala Leu Asp Arg Ile Gln Ala Ile Met  
 85 90 95

Thr Val Ala Gln Pro Ser Leu Ile Ile Ser Ile Gly Glu Phe Pro Leu  
 100 105 110

Glu Val Asp Asn Val Pro Ile Leu Asp Val Ser Gln Val Ser Ala Ile  
 115 120 125

Phe Glu Glu Lys Thr Pro Tyr Glu Val Thr His Ser Val Lys Gly Asp  
 130 135 140

Asp Asn Tyr Tyr Ile Ile Phe Thr Ser Gly Thr Thr Gly Leu Pro Lys  
 145 150 155 160

Gly Val Gln Ile Ser His Asp Asn Leu Leu Ser Phe Thr Asn Trp Met  
 165 170 175

Ile Ser Asp Asp Glu Phe Ser Val Pro Glu Arg Pro Gln Met Leu Ala  
 180 185 190

Gln Pro Pro Tyr Ser Phe Asp Leu Ser Val Met Tyr Trp Ala Pro Thr  
 195 200 205

Leu Ala Met Gly Gly Thr Leu Phe Ala Leu Pro Lys Thr Val Val Asn  
 210 215 220

Asp Phe Lys Lys Leu Phe Ala Thr Ile Asn Glu Leu Pro Ile Gln Val  
 225 230 235 240

Trp Thr Ser Thr Pro Ser Phe Ala Asp Met Ala Leu Leu Ser Asn Asp  
 245 250 255

Phe Asn Ser Glu Thr Leu Pro Gln Leu Thr His Phe Tyr Phe Asp Gly  
 260 265 270

Glu Glu Leu Thr Val Lys Thr Ala Gln Lys Leu Arg Gln Arg Phe Pro  
 275 280 285

Lys Ala Arg Ile Val Asn Ala Tyr Gly Pro Thr Glu Ala Thr Val Ala  
 290 295 300

Leu Ser Ala Val Ala Ile Thr Asp Glu Met Leu Glu Thr Cys Lys Arg  
 305 310 315 320

Leu Pro Ile Gly Tyr Thr Lys Asp Asp Ser Pro Thr Tyr Val Ile Asp

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<210> 16
<211> 919
<212> DNA
<213> Escherichia coli
<400> 16
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aatacgtcgc	tggcgtaaag	cctggttctc	ggccccata	aaagctgaac	gcaaagcgtt	180
tcgtgaagcg	ctacaagcag	agaactatga	cgcagttatc	gacgctcagg	ggctggtaaa	240
aagcgcggca	ctggtgacac	gtctggcgca	tggcgtaaag	catggattgg	actggcaaac	300
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gcacgccgta	gaacgcaccc	gcgaactgtt	tgccaaaagt	ttgggctata	gcaaacgcga	420

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gtcggtggtat acgggggttaa gccatttaac ggcggcactg gatagacca atatcacggt 780  
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aaacgctgcc atgatttaa 919

<210> 17  
<211> 1023  
<212> DNA  
<213> Escherichia coli  
<400> 17

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aatccagaga ttaacgcgct ctacggcata aaaaataaaa aagcaaaagc ctcagaaaaa 180  
attgccaaact tttttcatct catcaaggta ttacgtgccataaagtatga ccttatcgctc 240  
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gtgccgttgc aggggtggaaa tgtggtggaa agtaacttat ccgtgctgac cccattggga 420  
gttgattcgt tgggtgaagca gacaaccatg agttaccgc ctgcaagctg gaaacgatat 480  
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gctcgtgggt atgaagttgt tctgacgtcc ggcccagata aagacgatct ggctgctgc 660  
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<210> 18  
<211> 798  
<212> DNA



&lt;213&gt; Escherichia coli

&lt;400&gt; 18

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gaaatggcgg gcaaaagcta ttttctcaaa tggcatcgcg gcacgacct gaaagagata      180
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attcatcgac tgcgggatgt cggcgttgat actatgtatg gggtaggcatt tggcgaaaaa      300
ggcatgaatc cgctgaccag aacttcattt attattaccg aagatctgac accaaccata      360
agtctggaag attactgtgc tgactggcg actaaccctc cagatgttcg cgtaaagcgt      420
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cgtgactgtt atatctgtca tttcctgctg cacttgccct tttccggtaa ggaagaggag      540
ttaaaaattt cggtaattga cctgcaccgg gcgcagcttc gcacgcgcgt tccacgtcgt      600
tggcgggata aagatcttat tgggctttat ttttcttoga tgaatatcgg cctgactcag      660
cgggatatct ggcggtttat gaaagtgtat tttgccgcc cgcttaaaga cattctcaag      720
caggaacaag gactgctgtc gcaagcagaa gcaaaagcca caaaaatcag ggaaagaacg      780
attcgaaaat cgttgtaa                                     798

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&lt;210&gt; 19

&lt;211&gt; 1125

&lt;212&gt; DNA

&lt;213&gt; Escherichia coli

&lt;400&gt; 19

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tgggaaggcg aatgccctga tgtatttgaa ctgatcaaag tgccgggttaa atcgcatacc      180
aatcacgggc gcaatgcgga gtattttgcc tgggtgcaaa aacatttacg cgaacatccc      240
gtcgataaag tcgttggatt caacaaaatg ccggggctgg acgtttatta tgccgctgat      300
gtttgttatg ccgagaaagt agcgcaggaa aaaggctttt tctatcgct gacgtcacgt      360
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ctgatgctga cagataagca aatcgccgat ttccagaaac attatcagac tgaagcggag      480
cgttttcata ttctgccacc ggggatttat cctgatcgta aatatagcca gcagccagcc      540
aatagccgtg aaatcttccg taagaagaat ggaataaccg aacaacaata tttattgttg      600
caggtcgggt cagacttcac gcgtaaaggt gtcgatcggt ccattgaagc acttgcttcg      660
ttaccggatt cgctgcgcca caacacattg ctatatgttg ttgggcagga taaaccgcga      720
aaatttgagg cactggcaga aaaacgcggc gtgcgcagta atgttcaact cttctcgggg      780
cgcaacgatg tctcggaatt aatggcggcg gcggatttat tactgcatcc tgcctaccag      840

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gccgtttgtg gctatgcgca ttatattgtc gacgctaatt gcggcgaggc tattgctgag 960  
ccattccgcc aggaaacatt gaatgagatt ttacgcaaag cgtaaagca atcttcattg 1020  
cgccaggctt gggcggaata tgcgcgacat tatgctgata cacaagattt atacagtctg 1080  
ccagagaaaag cggcggatat cataacgggt ggtctggatg gttga 1125

<210> 20  
<211> 1047  
<212> DNA  
<213> Escherichia coli  
<400> 20

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gcgctattgt tacaagagga agcctga 1047

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<211> 1017  
<212> DNA  
<213> Escherichia coli  
<400> 21

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ctttttgggt gtgggtgttc aatcacgtca gttttgttac ataacaacga cgtgagtttt 180

gttttccacg tttttattga tgatatccct gaagccgata tccagcgttt agcccaattg 240  
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 <211> 909  
 <212> DNA  
 <213> Escherichia coli  
 <400> 22

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 cacgtgacta ttatgcaagt tcgtcagggt ctggcgaaag gcctgggaca cgcggtattg 360  
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 aagaagtaa 909

<210> 23  
 <211> 1641  
 <212> DNA  
 <213> Escherichia coli  
 <400> 23

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aacggctggt tcgccgcgcg tccgtcaggc acggaagacg catataagat ctactgcgaa     1560
agcttcctcg gtgaagaaca tcgcaagcag attgagaaag aagcggttga gattgttagc     1620
gaagttctga aaaacgcgta a                                     1641

```

<210> 24

<211> 1677  
<212> DNA  
<213> Escherichia coli  
<400> 24

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atgaaattat ttaaataaat tttactgatt gccgcctgtc acgcggcgca ggccagcgcg      60
gccattgata ttaacgctga cccaaacctt acaggagccg cgccgcttac cggatttctg      120
aacgggcaac agtcggatac gcaaaacatg agcggcttcg acaataacccc gccgccctca      180
ccgccggtgg taatgagccg tatgtttggg gtcactttt tcaacggcac cagcgcggat      240
agcgggtgca cggtaggatt caaccctgac tatattctga atccgggtga tagcattcag      300
gttcgcttgt ggggtgctt cacctttgat ggtgctgtac aggttgatcc caaaggtaat      360
attttcctgc cgaacgttgg tccggtgaaa gttgctggcg tcagtaatag tcagctaaat      420
gccctgggtca catccaaagt gaaggaagta taccagtcca acgtcaacgt ctacgcctcc      480
ttattacagg cgcagccagt aaaagtgtac gtgaccggat ttgtgcgtaa tcctgggtctg      540
tatggcggtg tgacgtctga ttcgttactc aattatctga tcaaggctgg cggcgttgat      600
ccagagcgcg gaagttacgt tgatattgtg gtcaagcgcg gtaaccgcgt gcgctccaac      660
gtcaacctgt acgacttcct gctgaacggc aaactggggc tttcgcagtt cgccgatggg      720
gacaccatca tcgtcggggc gcgtcagcat actttcagcg ttcagggcga tgtctttaac      780
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cgcccgaaca gcatgtcgca gatgaacgcg gttcagcttt atcgcccatc agtagctcag     1140
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cagtcctcca ccaaagaaga agccagcctg cgaatgcagg aagcgcaact gatcagccgc     1260
tttgtggcga aagcacgcac cgtagttccg aaagggtgaag tgatcctcaa cgaatccaat     1320
attgattctg ttctgcttga agatggcgac gtcacataa ttccggagaa aacatcgctg     1380
gttatggttc atggcgaagt gctgttcccg aacgcggtga gctggcagaa gggatatgacc     1440
accgaggatt acatcgagaa atgtgggtgg ctgacgcaga aatcgggtaa cgccagaatt     1500
atcgtcattc gtcagaacgg tgctgccgtc aacgcagaag atgtggattc actcaaaccg     1560
ggcgatgaga ttatggttct gccgaaatat gaatcgaaaa acattgaagt taccggtggg     1620
atttccacca tcctctatca gctggcggtg ggtgcaaaag tgattctgtc tttgtaa      1677
```

<210> 25  
<211> 624  
<212> DNA  
<213> Escherichia coli

&lt;400&gt; 25

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atgagtaaaa agttaataat atttggtgcg ggtggttttt caaaatctat aattgacagc      60
ttaaatcata aacattacga gttaatagga tttatcgata aatataaaag tggttatcat      120
caatcatatc caatattagg taatgatatt gcagacatcg agaataagga taattattat      180
tattttattg ggataggcaa accatcaact aggaagcact atttaaacad cataagaaaa      240
cataatctac gcttaattaa cattatagat aaaactgcta ttctatcacc aaatattata      300
ctgggtgatg gaattttttat tggtaaaatg tgtatactta accgtgatac tagaatacat      360
gatgccgttg taataaatac taggagttta attgaacatg gtaatgaaat aggctgctgt      420
agcaatatct ctactaatgt tgtacttaat ggtgatgttt ctgttggaga agaaactttt      480
gttggttagcg tgactgttgt aaatggccag ttgaagctag gctcaaagag tattattggt      540
tctgggtcgg ttgtaattag aaatatacca agtaatgttg tagttgctgg gactccaaca      600
agattaatta ggggggaatga atga                                           624

```

&lt;210&gt; 26

&lt;211&gt; 576

&lt;212&gt; DNA

&lt;213&gt; Escherichia coli

&lt;400&gt; 26

```

gtggcgaaga gcgtaaccgc aatttttctt gaccgtgatg gcaccattaa tgtcgatcac      60
ggctatgtcc atgagatcga caactttgaa tttatcgacg gtgttattga cgccatgcgc      120
gagctaaaaa aaatgggcctt tgcgctgggtg gtagtcacca accagtctgg cattgctcgc      180
ggtaaat,tta ccgaagcaca gtttgaaacg ctgaccgagt ggatggactg gtcgctggcg      240
gaccgagatg tcgatctgga tggatcttat tattgcccgc atcatccgca gggtagtggt      300
gaagagtttc gccaggctctg cgattgccgc aaaccacatc cggggatgct tttgtcagca      360
cgcgattatt tgcattattga tatggccgct tcttatatgg tgggcgataa attagaagat      420
atgcaggcag cggttgcggc gaacgtggga acaaaaagtgc tgggtgcgtac gggtaaacct      480
attacacctg aagcagaaaa cgcggcagat tgggtgttaa atagcctggc agacctgccg      540
caagcgataa aaaagcagca aaaaccggcg caatga                               576

```

&lt;210&gt; 27

&lt;211&gt; 933

&lt;212&gt; DNA

&lt;213&gt; Escherichia coli

&lt;400&gt; 27

```

atgatcatcg ttaccggcgg cgcgggcttt atcggcagca acatcgttaa agccctgaat      60
gataaaggca tcaccgatat tctgggtggtg gacaacctga aagacggcac caagtttgtg      120
aacctggttg atctgaatat cgcagactat atggataagg aagacttcct gatccagatt      180
atggctggcg aagagtccgg cgatgtcgaa gcgattttcc acgaaggcgc gtgctcttcc      240

```

```

accaccgagt gggacggcaa gtatatgatg gataacaact atcaatactc caaggagctg      300
ctgcactact gcctggagcg tgaaatcccg ttctgttacg cttcttccgc agccacctac      360
ggcggacgca cctccgactt tattgaatcc cgcgagtacg aaaaaccgtt gaacgtctac      420
ggttactcaa aattcctggt tgatgaatat gttcgccaaa tcctgccgga agcgaactcg      480
cagattgttg gcttccgcta tttcaacggt tatggaccgc gtgaaggcca taaaggcagc      540
atggcgagcg tcgctttcca tctcaacacc cagcttaata acggtgaatc accgaagctg      600
ttcgaaggta gcgagaactt taaacgcgac ttcgtctatg ttggcgatgt ggcagatgta      660
aacctgtggt tcctggaaaa tggcggtttcc ggcattctca acctcggcac cggtcgtgcg      720
gaatccttcc aggctgtagc tgatgctacg ctggcttata acaagaaagg ccagatcgaa      780
tacattccgt tcccgataa gctgaaaggc cgctaccagg cgttcactca ggcagatctg      840
acaaatctgc gcgcggcggg ttacgacaaa ccgttcaaaa ccgttgctga aggtgtaacg      900
gaatacatgg cctggctgaa tcgcgacgca taa                                     933

```

```

<210> 28
<211> 1434
<212> DNA
<213> Escherichia coli
<400> 28

```

```

atgaaagtaa cgctgccaga gtttgaacgt gcaggagtga tgggtggttg tgatgtgatg      60
ctggatcggt actggtacgg cccaccaggt cgtatctcgc cggaagcgcc ggtgcccggtg      120
gttaaagtga ataccatcga agaacgtccg ggcggcgcg gtaacgtggc gatgaatata      180
gcttctctcg gtgctaatac acgcctggtc gggttgacgg gcattgacga tgcagcgcg      240
gcgctgagta aatctctggc cgacgtcaac gtcaaatgcg acttcgtttc tgtaccgacg      300
catccgacca ttaccaaatt acgggtactt tcccgcaacc aacagctgat ccgtctggat      360
tttgaagaag gtttcgaagg tgttgatccg cagccgctgc acgagcggat taatcaggcg      420
ctgagttcga ttggcgcgct ggtgctttct gactacgcca aagggtgcgt ggcaagcgta      480
cagcagatga tccaaactggc gcgtaaagcg ggtgttccgg tgctgattga tccaaaaggt      540
accgattttg agcgctaccg cggcgctacg ctgttaacgc cgaatctctc ggaatttgaa      600
gctgttgctg gtaaatgtaa gaccgaagaa gagattgttg agcgcgcat gaaactgatt      660
gccgattacg aactctcggc tctgttagtg acccgttccg aacaggggat gtcgctgctg      720
caaccgggta aagcgccgct gcatatgcca acccaagcgc aggaagtgta tgacgttacc      780
ggtgcggggc acacggtgat tggcgctcctg gcggcaacgc tggcagcggg taattcgctg      840
gaagaagcct gcttctttgc caatgcggcg gctggcggtg tggtcggcaa actgggaacc      900
tccacggttt cgcgcatcga gctggaaaat gctgtacgtg gacgtgcaga tacaggcttt      960
ggcgtgatga ccgaagagga actgaagctg gccgtagcgg cagcgcgtaa acgtggtgaa     1020
aaagtgggtg tgaccaacgg tgtctttgac atcctgcacg ccgggcacgt ctcttatctg     1080

```

gcaaatgccc gcaagctggg tgaccgcttg attgttgccg tcaacagcga tgccctccacc 1140  
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 ggcgactggg aagcgggtcg ctgggtagtg tcgtttgaag aggacacgcc gcagcgcttg 1260  
 atcgccggga tcttgccaga tctgctggtg aaaggcggcg actataaacc agaagagatt 1320  
 gccgggagta aagaagtctg ggccaacggg ggccaagtgt tgggtgctca ctttgaagac 1380  
 gggtgctcga cgaccaacat catcaagaag atccaacagg ataaaaaagg ctaa 1434

<210> 29  
 <211> 1263  
 <212> DNA  
 <213> Escherichia coli  
 <400> 29

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 ggattatata ttgtttttcc tgttttctcag cctcatcatt taggtaagga aaaaaacagt 120  
 gcagtagcgt tgacaaaagg aggtttttaa agcagagttc aaaaagttag agctttcagt 180  
 gatcctaaag ccaattttgt ccctttcttt ggttcaagtg agtggttaag atttgatgca 240  
 atgcatccat cagtttttag agaggcttac aaaaggcctt atatcccata tcttttaggt 300  
 caaaaagggg cggcttctct gacacaatac tatggcattc aacagattaa aggacaaatc 360  
 aaaaataaaa aagctatcta tgttatttct ccgcaatggg ttgttcgcaa gggagccaac 420  
 aaagggtgctt ttcaaaaacta tttcagcaac gatcaaacca ttcgattttt gcaaaatcaa 480  
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 caaagactaa agtttaatga ttgggtattt gagaagacag atgctatttt tagctatcta 660  
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 aataaaaagt ggacagacta cacagggctt gatcaaaaaa tgtatcaaaa atctgtagaa 1020  
 aaaataaaac accaacttca aagtcaagggt ttcaatcata tctctgacct ttctcgagat 1080  
 ggaggtaagc catactttat gcaagataca atccatttag gttggaatgg ttgggttagag 1140  
 ctagataagc atatcaatcc atttttaaca gaggaaaaca gcaagccaaa ttatcacatt 1200  
 aataataaat ttttgaagag atcttgggca aaatatacag gacgtccaag tgattacaag 1260  
 taa 1263

<210> 30



<211> 1536  
 <212> DNA  
 <213> Escherichia coli  
 <400> 30

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atgatacatg atatgattaa aacaattgag catttttgctg agacacaagc tgattttcca      60
gtgtatgata ttttagggga agtccatact tatggacaac ttaaagtaga ctctgactct      120
ctagctgctc atattgatag cctaggcctt gttgaaaaat cacctgtctt agtattcggt      180
ggcacaagaat atgaaatggt ggcgacattt gttgctttta caaagtcagg gcatgcttat      240
ataccgggtg accaactctc tgctttggat agaatacagg ctattatgac agttgctcaa      300
ccaagcctta tcatttcaat tgggtgaattt cctcttgaag ttgataatgt cccaatccta      360
gacgtttctc aagtttcagc tttttttgaa gaaaagactc cttatgaggt aacacattct      420
gttaaagggtg atgataatta ctatattatt ttcacttcag ggactactgg tttacaaaaa      480
gggtgtgcaaa tttcacatga caattttatt agctttacaa attggatgat ttctgatgat      540
gagttttcag ttcttgaaag accgcaaatg ttggctcaac cgccatattc atttgactta      600
tcagttatgt attgggcacc aacactagct atgggaggca ccctgtttgc cctacaaaaa      660
acagtagtta atgatttcaa aaaactattc gctaccatta atgaattgcc aatacagggt      720
tggacttcga caccatcatt tgctgatatg gcgctactat ctaacgattt caattcagag      780
accttgccac agttaacaca tttttatttt gatggggaag agttaactgt caagactgca      840
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gcaacagttg ctctatccgc agtagcaatt actgatgaaa tgttagaaac atgcaaacgc      960
cttccaattg gttacactaa agatgactca ccaacgtatg tgattgatga agaaggcat      1020
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tatcttaaca atccagaaaa gacagctgag gcatttttcc aattcgaagg tctacctgct      1140
taccataccg gtgacttagg aagtatgacc gatgaaggct ttctgcttta cgggtgggct      1200
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ttaaacaaat cgcagtatgt aaaatcagca gtagcagtgc cacgttataa caaggatcat      1320
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cgtgatttgg atttgacaaa agcaattaag gaagacttaa aggacattat gatggattac      1440
atgatgccat ctaaatttat ctatcgagag gatttacctt tgacaccaaa tgggaaaatt      1500
gatatcaaag gtcttatgag cgaggtaaac aagtga      1536

```

<210> 31  
 <211> 60  
 <212> DNA  
 <213> Escherichia coli  
 <400> 31

```

tcgtgcaggc caacctgcac aacagagtga ttgattaac gtgtaggctg gagctgcttc      60

```

<210> 32  
<211> 60  
<212> DNA  
<213> Escherichia coli  
<400> 32

caggggtgctg gcgctcacca ttccggaga cagcttagac acatatgaat atcctcctta 60